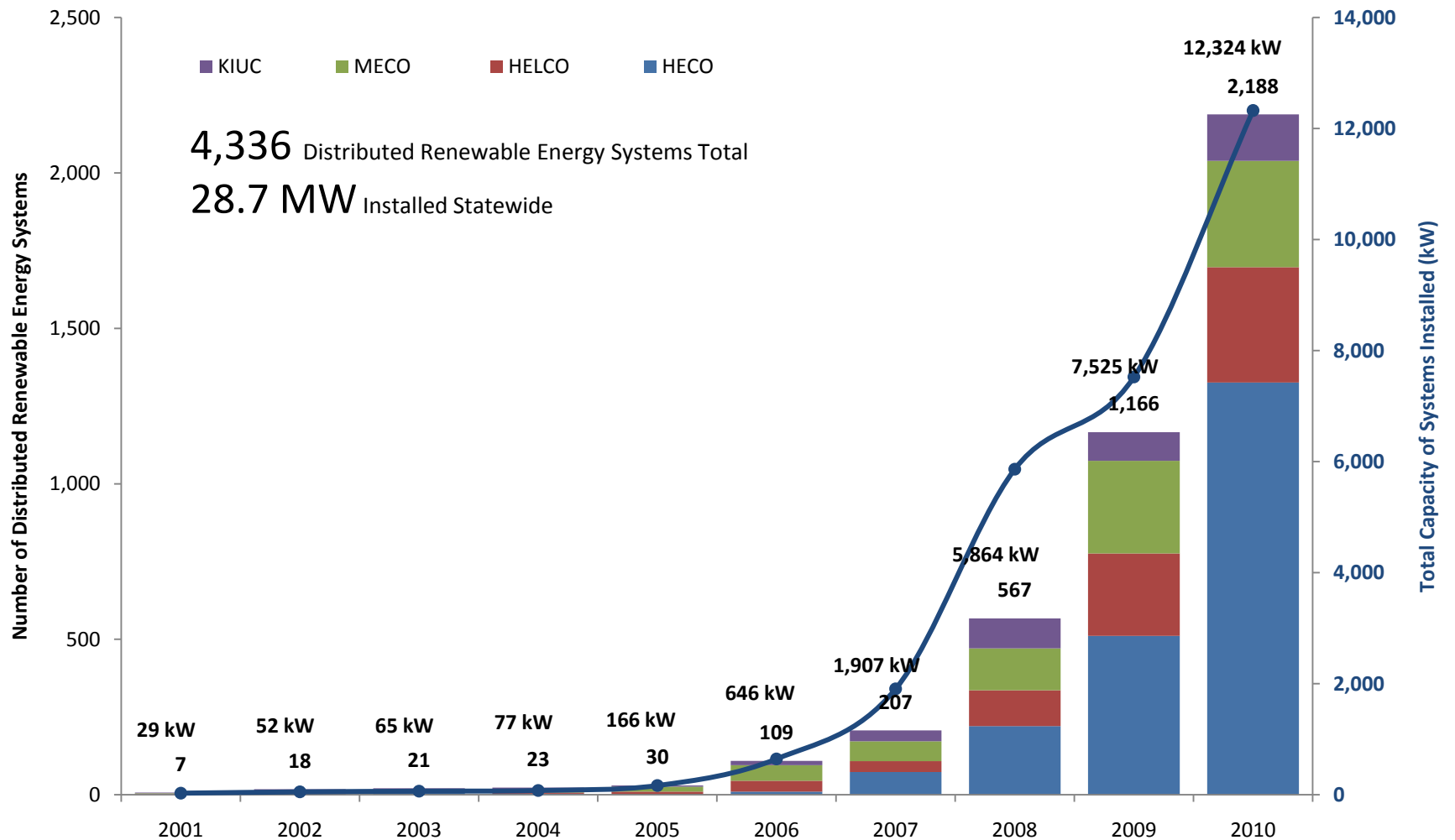


# How To Get Even More Solar Electricity

Ideas Submitted by the Panelists for  
Discussion

Asia Pacific Clean Energy Summit 2011

## New Distributed Renewable Energy Systems Installed in Hawaii Annually 2001-2010



# Grid Issues #1

- Small, isolated grids with limited capacity: excess energy leads to curtailment
- High distribution circuit penetration can impact feeder reliability
  - Voltage variations can exceed tariff limits
- Generation efficiency will be reduced when conventional power plants ramp up and down to match PV's intermittency

# Grid Issues #2

- Frequency or Voltage excursion throughout the grid may cause simultaneous trips of all inverters on system
  - Results in loss of generation & load shedding
  - Spinning units unable to respond fast enough

# Tax Credits Issues #1

- PV has parity with other resources only with continued tax incentives
- Tax incentives may be lost
- Loss of tax credits will hurt industry if no other incentives are available
- Exploitation of tax credits by financiers kills the golden goose
- PV is overly dependent on tax credits

# Tax Credits Issues #2

- Market uncertainty due to changing tax credits/tariffs
  - Hard for companies to invest in new equipment, reduce costs
  - Long-term impact

# Policy Issues

- Net Energy Metering
  - limits have been met without expansion
  - ending NEM
- Failure to recognize the value of green vs. black energy
- Need clear guidelines & regulations to allow higher than 15% circuit penetration
  - PV's contribution to grid will be very limited if this is not addressed

# Other Issues #1

- Who owns the PV systems?
  - Developer-owned: focus is selling power, ROI
  - Utility-owned: utility can control output, use full potential of inverter technology to dynamically respond to system events
- Module costs are down but installed system costs have not been reduced proportionately
- Price for PV must drop below “oil-fired” power
  - E.g., large-scale, ground-mounted PV



# Other Issues #2

- Product quality & consumer concerns
  - Low-cost modules from other countries & lesser-known companies
  - Increased uncertainty for consumers
  - Future market in jeopardy if products don't hold up in Hawaii's corrosive environment
- No incentives for owners to invest
  - Rental housing, multiple-unit housing

# Interconnection Solutions #1

- Streamlined interconnection application & permitting processes
  - Online
  - Include option to reserve capacity with a deposit for NEM and SIA projects (not just FIT)
- Simplified interconnection study process
  - Plain-language option for developer-managed engagement of approved 3<sup>rd</sup>-party engineering firms

# Interconnection Solutions #2

- Transparent circuit capacity checks
  - Snapshot feedback from utility on need for & cost of interconnection studies

# Other Solutions #1

- Energy storage
  - Assists with intermittency
  - Provides system benefits to islanded grid
  - Battery storage technology available now
- Closer collaboration with utility
  - Goal: establish shared engineering baseline
    - Increase grid penetration thresholds over time
    - Reduce curtailment risk

# Other Solutions #2

- Standardized guidance on equipment requirements
  - SCADA, storage, interconnection
  - Based on system size, location
- Make PV cost-competitive with non-renewables without tax credits
  - Leverage vertical integration & transactional efficiencies
  - Establish globally-competitive cost structure

# Large Scale PV as a Solution

- Large-scale, ground-mounted PVs
  - California: PPAs for 100 MW projects are \$110/MWh
    - Flat for 25 years, no escalation
    - In Hawaii: 5-MW PPAs are \$210/MWh + escalation
  - Land is available if Federal, Military, State & County landowners act on stated policies
  - One 100-MW ground-mounted PV project equals 50,000 residential rooftop systems

# Summary of Panelists' Issues

- Interconnection & grid quality issues
- Dependence on tax credits
- Cost competitiveness (system v. module costs; large-scale systems; compete w/o tax credits)
- Ownership
- Storage
- Product quality / consumer uncertainty
- Policies, e.g. to encourage “green” v. “black” energy